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REPORT OF THE SECRETARY OF THE BOARD OF EDUCATION ON THE  
SUBJECT OF SCHOOLHOUSES, SUPPLEMENTARY TO HIS FIRST ANNUAL  
REPORT.

(Concluded from our last Number.)

LIGHT. WINDOWS.

THE manner in which a schoolhouse is lighted is of no inconsiderable consequence. The additional cost of obeying philosophical principles is, at most, trivial. We ought also to remember, that the laws of Nature are never violated with impunity. In modern times the eye is much more used than it formerly was. Civilization has imposed multiplied and difficult labors upon that organ. Perhaps the eye gives fewer monitions of being overworked, than any other bodily power. It seems more to exhaust its strength, and then fail irrecoverably. If so, it should be protected by the foresight of reason. When provision is not made for admitting into a schoolroom a good deal more light than is ordinarily wanted, there will frequently be too little, and no remedy. Hence the windows should be such, as to furnish sufficient light at all times and means should be provided for excluding any excess. Window-blinds and curtains, therefore, are essential. The transitions of light in the open air are very great; but it is to be observed, that there is no out-of-door occupation which severely tasks the eye. But in a schoolroom, without blinds or curtains, when the sun is allowed to shine directly upon a child's head, book, or desk, the transition is greater and more sudden than in the open air; while, at the same time, the eye, being intensely engaged in looking at minute objects, has its pupil widely distended, so that the greatest quantity of light falls upon the optic nerve.

The following is extracted from a lecture, delivered by Dr. Edward Reynolds, of Boston, before the American Institute of Instruction, in 1833. "How much talent lies dormant by the morbidly sensitive eyesight, occasioned by inordinate and untimely use of the eyes! This last-mentioned evil is increasing to a fearful amount among the young. Accurate inquiries have convinced me, that a large number of these individuals must go back to the schoolroom to find the source of their infirmities."

No persons, going with their eyes unprotected, ever cross the Andes, without losing their sight. The glare of light from the snow destroys it. Such facts admonish us to beware of exposing the eyes of the young, either to very intense light, or to great transitions, while engaged in looking at small letters, or in making fine marks on white paper. To say that the loss or impairing of sight is an evil too contingent and uncertain to demand precaution, is neither philosophical nor humane. Admit, that it is a contingent and uncertain evil, in regard to any particular individual, so exposed; as it is uncertain, which of the children, in Egypt, shall be blind men; yet that some one out of a given number, subjected to the danger, shall be blind, is as certain as any law of Nature. Laws applicable to classes of men are just as infallible in their operation as those applicable to individuals, though we cannot foresee upon which of the individuals in the class the law is to

be verified. In a multitude of cases, each tendency, however slight, will have its quota of the results. Hence the necessity of meeting tendencies with prevention.\*

In order that passing, out-door objects and events may not draw off the attention of the scholars, it is usually recommended to insert the windows so high, that such objects and events will be invisible in the schoolroom. It cannot, however, be denied, that this gives to the room a prison or cellar-like appearance. May not such interruptions be better avoided by selecting a retired situation, and by arranging the seats, so that the scholars shall sit facing from the road? Nor can there be any necessity of having the windows very high for this purpose. As scholars sit in their seats, the eyes of but few will be more than three feet and a half from the floor. This would allow of windows six feet deep in a room ten feet high. So, too, it would be a perfect security against the evil, if the lower sash, or the lowest part of it, were glazed with ground glass. The windows should be made so that the upper sash can be lowered. This may be very desirable in summer, independently of the considerations, above urged, in regard to ventilation.

#### YARDS OR PLAY-GROUNDS.

On this subject, I have never seen, nor am I able to prepare, any thing so judicious, and apposite to the condition of the districts in Massachusetts, as the following paragraphs, taken from a Report, published in 1833, "by order of the Directors of the Essex County Teachers' Association."

"As the situation should be pleasant and healthful, so there should be sufficient space around the building. With the number who ordinarily attend these institutions, not less than a quarter of an acre should ever be thought of as a space for their accommodation; and this should be enclosed from the public highway, so as to secure it from cattle, that the children may have a safe and clean place for exercise at recess and at other times. We believe it no uncommon thing for a district to meet with difficulty in procuring a place for a house; for while most wish it to be near, they are unwilling to have it stand on a notch, taken out of their own field. This reluctance to accommodate the district may have been carried too far; the actual, may be less than the imagined evils. Yet it is not without foundation; for in most instances, from the scanty and niggardly provision made by the district, the man knows that his own cultivated fields must and will be made the place of the scholars' recreation. We do not overstate, when we say, that more than half the inconveniences which persons thus experience in their property from the contiguity of a schoolhouse, arises from the insufficient provision made for the children by the district. While all the district may think that a neighbor is unaccommodating, because he is unwilling to let them have just land enough to set their house upon, the real truth is, that the smallness of the lot is the very thing which justifies his reluctance; for whether he theorize or not on the subject, he well understands that he will have to afford accommodations, which the district are unwilling on their part to purchase. Every schoolhouse lot should be large enough for the rational exercise which the children ought to have, and will take. It would be well to have it large enough to contain some ornamental and fruit trees, with flower-borders, which we know children may be taught to cultivate and enjoy; and by an attention to which their ideas of property, and common rights, and obligations, would become more distinct. By attention to what belonged to themselves, they would be kept from many of those wanton injuries too often done to the possessions of those near them.

"In regard to space, no one can be ignorant of the general practice.

\* See Appendix C.

We believe it would be difficult in this county to find a score of these buildings, where the lot is as large as the most inexperienced on the subject would judge necessary.

"In by far the greater number of instances, there is no more ground than that which is occupied by the building; while many of them actually stand partly or wholly in the highway. The children, therefore, have no resort but to the public highway, or the private property of their neighbors, for amusement. Healthful and vigorous exercise is restrained, the modesty of nature is often outraged, and, not unfrequently, a permanent and extensive injury done to the finer and better feelings, which ought, at that age, to be cultivated and confirmed by the most careful attention, not only as a great security from sin, but as a most lovely ornament through life. Besides this, there being no place for pleasant exercise for the boys out of doors, the schoolroom, during the intermission at noon, becomes the place of noise and tumult, where, not from any real intention, but in the forgetfulness of general excitement, gentlemanly and lady-like feelings are turned into ridicule, and an attempt to behave in an orderly and becoming manner, subjects the individual to no small degree of persecution. We have often witnessed such instances, and known those who refused to engage in these rude exercises, forced out of the room and kept out during the greater part of an intermission, because their example cast a damp upon a course of rude and boisterous conduct, in which they could not take a part. Whatever others may think, it is our belief, that this noise and tumult are in a great measure the natural overflowing of youthful buoyancy, which, were it allowed to spend itself in out-door amusements, would hardly ever betray itself improperly in the house."

There is another topic of primary importance, the merits of which are so well developed in a portion of the 'Report' above referred to, that I shall need no apology for transferring it to these pages. It regards

#### THE DUTY OF INSTRUCTORS IN RELATION TO SCHOOLHOUSES.

"Though Instructors may, ordinarily, have no direct agency in erecting and repairing the buildings where they are employed to keep school, yet by a little carefulness, ingenuity, and enterprise, they can do much to avoid some of the evils connected with them. When about to open a school they can look at the house, as a mechanic at his shop, and adapt their system to the building, and not carry into a house, ill adapted to its development, a system of operations, however speculatively just it may appear in their own minds. The buildings are already constructed, and of materials not over plastic, and often as incapable of accommodating a system got up in some other place, as the house of the Vicar of Wakefield was, for the family painting. Instructors should make the most of what is comfortable and convenient, and remedy, as far as possible, what is bad. If the pupils are uncomfortably seated, they can allow them occasionally to change their seats, or alter their position, which, though attended with some inconvenience, cannot be compared with the evils growing out of pain and restlessness, and the effects which are likely to be produced upon the health, the disposition, morals, and progress in learning, from a long confinement in an uneasy position. Instructors can, and ought to use their influence and authority to preserve the buildings from injuries, such as cutting the tables, loosening and splitting the seats, breaking the doors and windows, by which most houses of this class are shamefully mutilated, and their inconveniences, great enough at first, are increased. The extent to which injuries of this kind are done, and the inconveniences arising from them in respect of writing-books and clothes, are great beyond what is ordinarily thought; and as it is possible in a considerable degree to prevent them, they should not be tolerated. So far as the scholars are concerned, they may arise from a mix-



ture of causes ;—thoughtlessness, idleness, a restless disposition, or real intent to do injury. But whatever may be the cause, it argues an imperfection in the moral principle, which, were it in wholesome exercise, would teach them that it is equally iniquitous to damage public as private property. The practice we refer to, is actual injustice, a real trespass, for which, in almost all other cases, the offender would be called to an account. And we must confess that it is matter of just surprise, that more efforts have not been made to prevent it. A high responsibility relative to this concern, rests on the instructors. The power of preventing this, lies principally with them. It is obvious then to remark, if they have much reason to complain for want of better accommodations, they have some reason to reform ; and in measuring out the blame which justly rests somewhere, to take a little portion to themselves. We are persuaded that schoolhouses will be more readily built and repaired, when instructors shall use more exertions to save them from the folly and indiscretion of children. The injuries complained of, we are persuaded, if not wholly, yet to a great extent, can be prevented ; and it is high time that parents and teachers should bring together their fixed and operative determination, to suffer them no longer. Separate from the inconveniences which scholars themselves experience from them, a licentious and irresponsible feeling, in regard to public property, is encouraged. If the well-known loose sense of obligation in respect to public interests, and the wanton injuries which are so frequently done to institutions of a public nature of every description, so pre-eminently common throughout this country, do not spring up in the habits referred to, they are certainly most powerfully fostered by them ; and there is great reason to apprehend, that a principle so loose in respect to public property, must extend itself by easy transitions to private. In every view, the practice is wrong, and the effect corrupting ; and it is high time, that the attention of the community was directed to it, the obligations of men on this subject, more fully taught, and, when necessary, enforced in all our institutions of learning, from the Infant School to the Professional Hall, not excepting our Theological Seminaries, where, if in any place, we should expect regard would be paid to public rights, and the bestowments of private munificence ; and we could wish the evil complained of, stopped here ; but truth constrains us to say, that the tables and seats of the Bench and Bar in our court-houses, the pews, and even the pulpits, in our places of religious worship, bear evident marks, that neither the '*ermine* nor the *lawn*,' is sufficient to restrain this most shameful, deforming, and mischievous practice.

"Teachers should take the *management* of the fire entirely under their own control ; for though their own *feelings* may not be the thermometer of the room, yet, if they are at all qualified to teach, they must possess more discretion on the subject, than those under them. They should see that the room is in a comfortable condition by the time the exercises commence. Many a half day is nearly wasted, and sometimes, from the disorder consequent upon the state of things, worse than lost, because, when the children collect, the room is so cold, that they cannot study, nor can they be still. Nothing short of the master's being in the house a half hour before the school commences, can, ordinarily, secure the object referred to. It may be objected, that instructors are not employed to build fires. We do not ask them to do it ; but we ask them to see that fires are seasonably built. And we must think those who can define so nicely the limits of their obligations, as to excuse themselves from this care, have not the spirit of high-minded and enterprising teachers, and that, however worthy they may be, and however well qualified for other employments, they should never offer themselves for that of school-keeping.

"Instructors should see, also, that the schoolroom be, in all its parts, kept in a clean and comfortable condition. Cleanliness is not ordinarily ranked so high, nor is the contrary habit ranked so low, in the scale of moral

worth and sinful defilement, as they should be, nor do they, as we fear, enter so fully into the account when men are estimating their own moral state, or when others are estimating it for them, as they ought. We will not say, as a very able and careful observer of men once said, that he did not believe any person could be a true Christian, who was not becomingly neat in his person and in his business ; yet we are free to say, that every additional year's intercourse with the world in moral and religious concerns, deepens the conviction, that cleanliness is inseparable from any considerable advancement in a religious life, and that where its requirements are disregarded, there is much reason to apprehend that other and important defects of a moral nature do, most probably, exist. Cleanliness in one's person, and the various occupations, is intimately connected with manly and upright conduct, chaste and pure thoughts, and sensible comfort in any situation ; and, as a *service* exacted, or a *habit* established, would go far to secure good order and agreeable conduct in any school. We are persuaded that one of the most powerful helps towards good government, and consequent orderly conduct among the pupils, is overlooked, through inattention or ignorance, where this principle is not called in ; and where an exertion to establish a principle and habit of neatness has not been put forth, one of the strong bonds to a future worthy moral conduct is lost, and a most important and legitimate object of instruction and education neglected. Great exertions should be used to cultivate among the pupils a taste for cleanliness, decency, and elegance in all things, and their particular responsibility in respect to the proper state of the house, and all its outward connexions. This is their *home*, for the good and decent state of which, their character is at stake, and their comfort involved. They should firmly and perseveringly resolve, that the schoolroom should be kept clean ; not simply swept, but often washed, and every day dusted. Without this attention, it is impossible their own persons, their clothes, or books, can be preserved in a decent and comfortable state. The room they should consider as their parlor, and those that occupy it, company to one another. The room must, therefore, always be in a visiting condition. And what should prevent this ? Cannot a number of young people, all of whom, it must be presumed, are trained to order and neatness at home, bring the principles of order and neatness into an apartment, where they are to spend so much time together, and where any one, who knows much of the business of common families, must know there is less excuse for any disorder or dirt, than there is in most of our houses ? We know it is practicable to have a schoolroom kept in a comfortable condition, and that youth instructed and encouraged to do this, and having their attention sufficiently directed to it, will soon become interested in the subject, and manifest a commendable disposition to have things as they ought to be, and a willingness to make all the personal efforts which are required, to accomplish it. And we are persuaded, that, when this is attempted, it will be found, perhaps, to the surprise of many, that from the less injury done to the clothes of scholars and to the books, as well as from the better conduct which will invariably ensue, many of the evils, connected with our Common Schools, would be removed.

"It is a fact, susceptible of as perfect demonstration as any moral proposition, that filth and dirt, if they be in part the effect, are, at the same time, among the most efficient causes of corrupt morals and debased conduct. Gisborne, in one of his works, has a remark of this kind, (we do not pretend to quote his words,) that in a part of London, more young families, who, at setting out in life, promise well, are made corrupt, and led into wretched and destructive habits, from the unhappy location of houses, which renders all attempts to keep them in a pure and comfortable condition ineffectual, than from any other single cause. Ineffectual efforts to keep things neat lead to neglect, neglect to filthy habits, and filthy habits to low and degraded vice. If such be the operation of a want of neatness in families,

and we apprehend the justness of the remark will find support in instances which must have fallen within the knowledge of every attentive observer, are there not reasons to fear, that the same effects will follow the same course in school? There can be no doubt that, in many instances, a sense of propriety is destroyed, in more, greatly weakened, by the state of things in and about the houses of education. A disregard to this subject, too common among scholars, often settles down into a confirmed habit, and gradually spreads itself over the whole surface of action, and through life; the individual becomes less interesting in his appearance, less agreeable in his manners, less honorable in his conduct, and less moral and upright in his principles.

"Instructors should also guard against the bad influence upon the dispositions and manners of scholars, which the inconveniences they experience are apt to produce. The pain and uneasiness which a child experiences from an uncomfortable situation in school, he will very likely associate with his books and studies, or with the instructor and regulations of school; he may connect them with those who sit near him, and who may be just as uneasy as himself, and be ready to hate the whole and quarrel with all, because he feels pain, and cannot, or does not, rightly understand the occasion of it. The local situation of children in school has a most obvious bearing upon the conduct and temper. Place them a little out of the observation of the instructor, and they will play; put them where they are crowded, or sit with inconvenience, and they will quarrel. 'It has often been a subject of interest to me,' says one of the committee, 'when visiting schools, to observe the operations of local circumstances upon the mind and conduct of children; and the more I have observed, the more importance am I constrained to attach to these things. In one house where I have many times called, I do not recollect ever passing a half hour, without seeing contention among those placed in a particular part of the room, and play in another. I distinctly recollect the same thing in the seminary where I pursued my preparatory studies. It was as obvious in the lecture-room in college. In the seminary which I had the care of for some years, it was so apparent that I often changed the situation of those who were unfavorably placed, to prevent the feelings and conduct likely to be produced from settling down into confirmed habits. For permanent bad effects may and have, in fact, grown out of these circumstances. Quarrels, also, which have sprung up between children, and which had no other legitimate cause, than their being placed together in school, on uncomfortable seats, have led to a state of unkind feelings, and unfriendly conduct through life. The influence has sometimes extended beyond the individuals; families and neighborhoods have been drawn into the contention; and, in not a few instances, whole districts thrown into disorder, only because at first some little twig of humanity had become restless and quarrelsome, in consequence of his uneasy position in school.'

"But if the effect be confined to the individual, yet it may be sufficiently unhappy. Suppose, from one of the causes above named, the child acquire a habit of loose and foolish playfulness, or of restless discontent—suppose he acquire a disrelish for schools, his books, or unkind feelings towards his instructor, or his fellows—will there not be much personal loss, and is there no danger of future consequences—is there no danger that these feelings will go into future life, and the individual prove less comfortable to himself, and less comfortable to others? Youth is the season when the character is formed, and direction given to the feelings and the conduct. It is a matter of no small interest to the man himself, or those with whom he is to act in future life, that these be of a gentle and accommodating character.

"Since, therefore, from the construction of many of our schoolhouses, it is not possible for the scholars to be altogether free from suffering, it is a subject well worthy the special attention of instructors, carefully to guard



against the consequences which it is like to produce upon their temper and conduct. This may be done, in some degree, by allowing the children occasionally to change their situation, to rise and stand up a few minutes ; or, at convenient seasons, giving them a short additional recess. To remove, in some degree, the gloom and deformities of the house, and at the same time to draw off the attention from their bodily pains, scholars should be allowed to ornament it with greens and flowers, and other things of an innocent nature, attracting to the minds of youth. Agreeable objects originate agreeable feelings, and pleasant feelings lead to good conduct. We would also recommend to instructors to encourage the children, in places where there is the least prospect of security, to cultivate flower-borders upon the schoolhouse grounds ; and certainly in boxes set in the house. Should it be objected, that their attention would in this way be withdrawn from their books, we must reply, that we doubt the fact, and would in turn ask whether the feelings, the taste, and the understanding would not be most essentially improved by attention to the works of Nature, and efforts to bring to the highest perfection, those things which a wise Providence, who knows by what means the character of man is to be formed, has made beautiful to the eye. Our own feelings have often been hurt, and our views of expediency entirely crossed, when we have seen, as we have on many occasions, a handsome branch, or beautiful flower, or well-arranged nosegay, torn in a censorious and ruthless manner from the hand of a child, or the place where his love for ornament and beauty had placed it. We would encourage the children to make the room of confinement as pleasant to them, as they can consistently with other duties ; and if at any time it be observed, that these things are gaining an undue influence over them, to check it as any other practice not evil in itself, but only in excess, should be corrected. It should be done in such a manner, that the child should be left free to enjoy, as far as it is safe to enjoy, and feel too that he does it with the full approbation and good-will of his instructor.

“There is one subject more to which we must be permitted to refer ; one with which the morals of the young are intimately connected, one in which parents, instructors, and scholars should unite their efforts to produce a reform. There should be nothing in or about the schoolhouses, calculated to defile the mind, corrupt the heart, or excite unholy and forbidden appetites ; yet, considering the various character of those brought together in our public schools, and considering also how inventive are corrupt minds, in exhibiting openly the defilement which reigns within, we do not know but we must expect that schoolhouses, as well as other public buildings, and even fences, will continue to bear occasional marks both of lust and profaneness. But we must confess, that the general apathy which apparently exists on this subject, does appear strange to us. It is an humbling fact, that in many of these houses, there are highly indecent, profane, and libidinous marks, images, and expressions, some of which are spread out in broad characters on the walls, where they unavoidably meet the eyes of all who come into the house, or, being on the outside, salute the traveller as he passes by, wounding the delicate and annoying the moral sensibilities of the heart ; while there is still a much greater number, in smaller character, upon the tables and seats of the students, and even, in some instances, of the instructors, constantly before the eyes of those who happen to occupy them. How contaminating these must be, no one can be entirely insensible. And yet how unalarmed, or, if not entirely unalarmed, how little is the mind of the community directed to the subject, and how little effort put forth to stay this fountain of corruption. Such things ought not to be ; they can, to a considerable extent, be prevented. The community are not, therefore, altogether clear in this matter.

“When we regard the deleterious effect which the want of accommodation and other imperfections, in and about these buildings, must have upon

the growth, health, and perfectness of the bodily system, upon the mental and moral powers, upon the tender and delicate feelings of the heart, we must suppose there is as pressing a call for the direct interference of the wise and benevolent, to produce an improvement, as there is for the efforts of the Prison Discipline Society, or for many of the benevolent exertions of the day. And we do most solemnly and affectionately call upon all, according to their situation in life, to direct their attention to the subject; for the bodies, the minds, the hearts of the young and rising generation require this. It is a service due to the present and future generation. A service due to their bodies and souls."

I will now bring this long statement to a close by the enumeration of a few further particulars, which could not well be arranged under any of the preceding heads; *and shall omit such things only as no CIVILIZED people can ever forget.*

Where the expense can be afforded, every schoolhouse should be provided with a bell. If not the only mode, it is probably the best one for insuring punctuality; and the importance of punctuality can hardly be overstated, either as it regards the progress of the school collectively, or the habits of the individual pupils. If morals were to be divided into the greater and the less, the virtue of punctuality should be set down in the first class. Probably there are few districts, which would not obtain a full equivalent, every year, for the price of a bell, in the improved habits and increased progress of the children.

It is also very desirable to have a time-piece placed in some part of the schoolroom, where it can be seen by all the scholars. It is both encouragement and relief to them. It has an effect upon the pupils, just like that of mile-stones upon travellers. Men and children have a wonderful power of adapting themselves to circumstances; but, with all their flexibility, neither child nor man can ever adapt himself to a state of suspense or uncertainty. All the large schools in the city of Lowell are provided with a clock, which strikes after stated intervals. This is a signal for classes to take their places for recitation, and for reciting-classes to return to their seats.

Many schoolhouses in the country, are situated a hundred rods or more from any dwelling-house. In all cases it is desirable, but in such cases it seems almost indispensable, to have a pump or well, where water for drink and so forth can be obtained. In the summer, children usually require drink once in half a day. A hundred rods is too far for them to run in a brief intermission, or for water conveniently to be carried;—to say nothing of the inconvenience to a neighbor of having his premises invaded year after year, and, perhaps, his gardens and fruit-trees thereby subjected to petty depredations.

No children or teacher ought ever to be blamed for having a mud-plastered floor, if mats and scrapers are not placed at the doors of the house.

If there be not a cellar for wood when that species of fuel is used, a shed in which to house it is indispensable.

In the year 1831, the censors of the American Institute of Instruction submitted to that body a 'Plan of a Village Schoolhouse.' As the object of this Report is, not so much to present a model for universal adoption, as to explain the great principles which should be observed, whatever model may be selected; I have thought it might be acceptable to accompany this Report with the 'Plan' which was submitted by the censors as above stated, together with all the material parts of their explanation of it. They are therefore appended. [See the 2d volume of the Lectures of the American Institute of Instruction, p. 285, et seq.]

It will be perceived, that the 'Plan' of the censors exhibits a Doric portico in front of the house. Such an ornament would be highly creditable



to the district, which should supply it. It would be a visible and enduring manifestation of the interest they felt in the education of their children. And what citizen of Massachusetts would not feel an ingenuous and honorable pride, if, in whatever direction he should have occasion to travel through the State, he could go upon no highway, nor towards any point of the compass, without seeing, after every interval of three or four miles, a beautiful temple, planned according to some tasteful model in architecture, dedicated to the noble purpose of improving the rising generation, and bearing evidence, in all its outward aspects and circumstances, of fulfilling the sacred object of its erection? What external appearance could impress strangers from other States or Countries, as they passed through our borders, with such high and demonstrative proofs, that they were in the midst of a people, who, by forecasting the truest welfare of their children, meant nobly to seek for honor in the character of their posterity, rather than meanly to be satisfied with that of their ancestors? And how different would be the feelings of all the children towards the schools, and through the schools towards all other means of elevation and improvement, if, from their earliest days of observation, they were accustomed always to look at the schoolhouse, and to hear it spoken of, as among the most attractive objects in the neighborhood!

In the preceding remarks, I have suggested defects in the construction of our schoolhouses only for the purpose of more specifically pointing out improvements. I would not be understood as detracting from, but as attesting to, their usefulness, as they are. Although often injudiciously located, unsightly without, and uncomfortable within, yet, more than any thing else, they tend to convert the hope of the philanthropist into faith, and they fill him with a gratification a thousand times nobler and more rational than the sight of all the palaces in the Old World.

HORACE MANN,  
*Secretary of the Board of Education.*

*Boston, March 27, 1838.*

#### APPENDIX.

(A.)

*Letter from DR. SAMUEL B. WOODWARD, Superintendent of the State Lunatic Hospital, at Worcester.*

*Worcester, March 14, 1838.*

HON. HORACE MANN, *Secretary of the Board of Education:*

DEAR SIR:—Your note and queries, respecting the construction of schoolhouses, came to hand yesterday; I improve the earliest opportunity to reply.

First, as to the ill effects of high and narrow benches, and seats without backs.

High and narrow seats are not only extremely uncomfortable for the young scholar, tending constantly to make him restless and noisy, disturbing his temper, and preventing his attention to his books, but they also have a direct tendency to produce deformity of the limbs.

If the seat is too narrow, half the thigh only rests upon it; if too high, the feet cannot reach the floor; the consequence is, that the limbs are suspended on the centre of the thigh. Now, as the limbs of children are pliable or flexible, they are easily made to grow out of shape, and become crooked, by such an awkward and unnatural position.

Seats without backs, have an equally unfavorable influence upon the spinal column. If no rest is afforded the backs of children while seated, they almost necessarily assume a bent and crooked position; such a position, often assumed, or long continued, tends to that deformity, which has become extremely common with children in modern times—and leads to disease of the spine in innumerable instances, especially with delicate female children.

The seats in schoolrooms should be so constructed that the whole thigh can rest upon them, and at the same time the foot stand firmly upon the floor; all seats should have backs high enough to reach the shoulder-blades; low backs, although better than none, are far less easy and useful than high ones, and will not prevent pain and uneasiness after sitting a considerable time. Young children should be permitted to change their position often, to stand on their feet, to march, and to visit the play-ground. One hour is as long as any child, under ten years of age, should be confined at once; and four hours as long as he should be confined to his seat in one day.

*Second Query*—"What general effects will be produced upon the health of children by stinting their supply of fresh air, through defects in ventilation?"

An answer to this query, will involve some chemical principles, in connexion with the animal economy, not extensively and fully understood.

The blood, as it circulates through the vessels in our bodies, accumulates a deleterious principle called CARBON, which is a poison itself, and must be discharged frequently, or it becomes dangerous to life. In the process of respiration or breathing, this poisonous principle unites in the lungs with a proportion of the oxygen of the air, and forms *carbonic acid*, which is expelled from the lungs at each expiration. The proportion of oxygen in the air received into the lungs, is about twenty-one in the hundred; in the air expelled, about eighteen in the hundred;—the proportion of carbonic acid in the inhaled air is one part in the hundred, in the exhaled air about four parts in the hundred. By respiration, an adult person spoils, or renders unfit for this vital process, about one gallon of air in a minute. By this great consumption of pure air in a schoolroom, made tight and filled with scholars, it will be easily seen that the whole air will soon be rendered impure, and unfit for the purpose for which it is designed. If we continue to inhale this contaminated air, rendered constantly worse the longer we are confined in it, this process in the lungs will not be performed in a perfect manner; the carbon will not all escape from the blood, but will be circulated to the brain, and produce its deleterious effects upon that organ, to which it is a poison. If no opportunity be afforded for its regular escape, death will take place in a few minutes, as in strangulation by a cord, drowning, and immersion in irrespirable air. The cause of death, is the retention and circulation of this poisonous principle, in all these cases.

If a smaller portion is allowed to circulate through the vessels than will prove fatal, it produces stupor, syncope, and other dangerous effects upon the brain and nerves. In still less quantity, it produces dulness, sleepiness, and incapacitates us for all mental efforts and physical activity. The dulness of a school, after having been long in session in a close room, and of a congregation, during a protracted religious service, are often attributable to this cause *mainly*, if not *solely*. Both teacher and scholar, preacher and hearer, are often greatly affected in this way, without being at all sensible of the cause. Fifty scholars will very soon contaminate the air of a schoolroom at the rate of a gallon a minute.

Suppose a schoolroom to be thirty feet square and nine feet high, it will contain 13,996,000 cubic inches of atmospheric air. According to Davy and Thompson, two accurate and scientific chemists, one individual respires and contaminates 6500 cubic inches of air in a minute. Fifty scholars will respire 325,000 cubic inches in the same time. In about forty minutes, all the air of such a room will have become contaminated, if fresh supplies are not provided. The quantity of carbonic acid produced by the respiration of fifty scholars, will be about 750 cubic inches in an hour.

From these calculations, we must see how soon the air of a schoolroom becomes unfit to sustain the animal powers, and how unfavorable to vigorous mental effort such a contaminated atmosphere must prove to be. To avoid this most serious evil, is a desideratum, which has not yet been reached in the construction of schoolhouses.

In my opinion, every house and room which is closed for any considerable time upon a concourse of people, should be warmed by pure air from out of doors, heated by furnaces placed in a cellar, (and every schoolhouse should have a cellar,) or in some contiguous apartment, so that the supply of air for the fire should not be from the schoolroom. Furnaces for warming external air, may be constructed cheaply, so as effectually to answer the purposes of warmth and ventilation.

When a quantity of warm fresh air is forced into a schoolroom by means of a furnace, the foul air is forced out at every crevice, and at the ventilating passages; the currents are all warm quite to these passages.

But if the room is warmed by a stove or fireplace, the cold air from without rushes in at every passage and every crevice, and while the parts of the body nearest the fire are too warm, the currents of cold air rushing to the fire to sustain the combustion, keep all the other parts cold and uncomfortable. This is a most direct way to produce disease; nothing can affect the system more unfavorably than currents of cold air coming upon us when quite warm.

I have said that schoolhouses should have cellars under them. The floor of a building without a cellar is always cold, and often damp; this tends to keep the feet of scholars cold, while the head, in a region of air much warmer, will be kept hot. This is both unnatural and unhealthful. The feet should always be kept warm and the head cool. No person can enjoy good health whose feet are habitually cold. In schoolrooms heated by stoves, the feet are very liable to be cold, while the upper stratum of air, kept hot and dry by a long reach of pipe, produces a very unpleasant and unfavorable state of the head—head-ache, vertigo, and syncope often take place in such a room.

The human body is so constituted, that it can bear almost any degree of heat or cold, if the change be not too sudden, and all parts of it be subjected to it alike. We find no particular inconvenience from respiring air at the temperature of ninety degrees on the one

hand, or at zero on the other ; but inequalities of temperature, at the same time, affect us very differently, and can never be suffered for a long time without danger.

There is one consideration in the preparation of furnaces for warming rooms, that should not be overlooked. The object should be to force into the room a large quantity of air heated a few degrees above the temperature required, rather than a small quantity at a much higher temperature. The air-chamber should be capacious, and the passages free. The air should always be taken from out of doors, and never from a cellar. The air of a cellar is often impure itself, and, if pure, a cellar that is at all tight cannot furnish an adequate supply. The whole air of a schoolroom should be changed at least every hour ; if oftener, it would be better. If a cellar is not much larger than the room above it, this supply will soon be exhausted also. The air of the cellar may be sufficient to supply the combustion of the fuel ; this is all it should do—and for this purpose it is better than air from out of doors, as the coldness of this checks the heat, and diminishes the temperature of the fire, and its power of heating the furnace.

In giving my views on this subject, I have been so desultory as to embrace nearly all that I can say on the other queries proposed to me. At any rate, my letter is already of an unreasonable length, and I must come to a close. Wishing you every success in the arduous duties of your present station, I remain truly and affectionately yours,

S. B. WOODWARD.

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(B.)

*Extract of a Letter from BENJAMIN SILLIMAN, Professor of Chemistry in Yale College, in reply to an inquiry similar to the SECOND proposal to Dr. Woodward.—See p. 298.*

Of our atmosphere, only one fifth part, by volume, is fitted to sustain life. That portion is oxygen gas ; the remaining four fifths being azote or nitrogen gas, which, when breathed alone, kills by suffocation. The withdrawing of the oxygen gas, by respiration or otherwise, destroys the power of the atmosphere to sustain life, and this alone furnishes a decisive reason, why fresh air must be constantly supplied, in order to support animal life. But this is not all. Every contact of the air with the lungs, generates in the human subject from six to eight per cent. of carbonic acid gas—the same gas that often destroys the lives of people who descend, incautiously, into wells, or who remain in close rooms, with a charcoal fire not under a flue. This gas—the carbonic acid—kills, it is true, by suffocation, as azote does, and as water acts in drowning. But this is not all. It acts *positively*, with a peculiar and malignant energy, upon the vital powers, which, even when life is not instantly destroyed, it prostrates or paralyzes, probably through the nervous system.

I find by numerous trials made with my own lungs, that a confined portion of air,—sufficient, however, to fill the lungs perfectly with a full inspiration,—is so contaminated by a single contact, that a candle will scarcely burn in it at all ; and, after three contacts, the candle will then go out, and an animal would die in it as quickly as if immersed in azote, or even in water.

It is evident, therefore, that a constant renewal of the air is indispensable to safety as regards life, and no person can be compelled to breathe, again and again, the same portions of air, without manifest injury to health, and, it may be, danger to life.

It follows, then, that the air of apartments, and especially of those occupied by many persons at once, ought to be thrown off by a free ventilation ; and, when blown from the lungs, the same air ought not to be again inhaled, until it has been purified from the carbonic acid gas, and its due proportion of oxygen gas restored. This is effected by the upper surface of the green leaves of trees and plants, when acted upon by the direct solar rays. The carbonic acid gas is then decomposed, the carbon is absorbed to sustain, in part, the life of the plant, by affording it one element of its food, while the oxygen gas is liberated and restored to the atmosphere.

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(C.)

*Extract of a Letter from DR. SAMUEL G. HOWE, Director of the Institution for the Education of the Blind, in Pearl Street, Boston.—See p. 290.*

I take it for granted, that the existence of blindness, in the human race, like every other physical infirmity, is the consequence of departure from the natural laws of God ; that the proportion of blind persons in every community is dependant upon the comparative degree of violation of the natural laws ; and that scientific observation can in almost every case point to the kind and degree of violation.

Imperfect vision, partial and total blindness, are more common among men than animals, and in civilized than in savage or barbarous nations. It seems to be well ascertained, that



blindness is more common as we approach the equator ; and that on the same parallel it is more frequent in dry sandy soils, than in humid ones.

It is supposed by some, that in very high latitudes blindness is more frequent than in the temperate zones, on account of the strong reflection of the sun's rays by the snow ; but besides that we have no statistical returns to confirm this opinion, there are other causes which make it doubtful ; the solar rays are much less powerful, the days are short, and the tendency to local or general inflammations and congestions of blood, is much less in cold than in warm climates. Without, however, dwelling upon general rules, I will come at once to causes operating in our own climate.

Any one who has reflected that man was created with a perfect physical organization—that his eye, the noblest organ of sense, was fitted to reach to a distant star, or to examine the texture of the gossamer's web, will be struck by the fact that every tenth man he meets is either near-sighted, or far-sighted, or weak-eyed, or has some affection or other of the vision. Now, the frequency of this departure from the natural state of the vision, is not a fortuitous circumstance; if there were but a single case, it must be referrible to a particular cause; and, *a fortiori*, when it prevails in every section of the country, and in every generation. Let us consider the greatest derangement of vision—blindness : there are very few cases, where the eye is totally insensible to light ; let us call every person blind, whose organ of vision is so permanently deranged, that he cannot distinguish the nails upon his fingers ; for many persons can see how many fingers are held up between the eye and a strong light, who cannot see the nails. Of persons blind to this degree, and of those totally blind, there are about one in two thousand in the United States. This calculation is warranted by statistical returns, which are liable to error, only in putting down too few.

Of these six thousand five hundred persons, but very few lose their vision by wounds, injuries, or acute inflammation ; the great majority are blind in consequence of violation of the natural laws, either by themselves or their parents ; for I hold it to be indisputable, that almost every case of congenital blindness, is the penalty paid by the sufferer for the fault of the parent or progenitor. The number of cases of hereditary blindness, and of hereditary tendency to diseases of the eye, which have come under my observation, have established this beyond all doubt in my own mind.

I have known many cases, where a parent, with defective vision, has had half his children blind ; and one case, where both parents had defective vision, and all their children, *seven in number*, were blind.

There are, then, causes at work in our own community, which destroy the vision of one two-thousandth part of our population, and impair the vision of a much greater part ; and although each individual thinks himself secure, and attributes the blindness, or defective vision of his neighbor, to some accidental or peculiar circumstance, from which *he* himself enjoys immunity, yet the *cause* will certainly have its *effect* ; the violation of the natural laws must have their penalty and their victim—as a ball, shot into a dense crowd, must hit somebody. It is incumbent, then, upon each one, in his individual capacity, to avoid the remote and predisposing, as well as the immediate causes of impaired vision ; and it is incumbent on those, who have an influence upon the condition and regulations of society, to use that influence for the same end.

It would lead to tedious details, to consider the various modes in which each individual or each parent should guard against the impairment of vision ; but there are some obvious dangers to which children are exposed in schools, which may be pointed out in a few words.

You will often see a class of children reading or writing with the sun shining on their books, or writing in a dark afternoon with their backs to the window, and their bodies obstructing its little light ; and if you tell the master he is perilling the eyesight of his scholars, he thinks he gives you a complete discomfiture, by saying, that he has kept school so for ten years, and never knew a boy to become blind ; nevertheless, it is a cause of evil, and so surely as it exists it will be followed by its effect.

A boy reading by twilight, or by the blaze of a fire, or by moonlight even, will tell you he does not feel the effects ; nevertheless, they follow as closely as the shadow upon the substance ; and if, ten years afterwards, you see the boy selecting glasses at an optician's, and ask him what caused his imperfect vision, he will tell you that there was no *particular* cause ; that is, the amount of evil done at any particular time, was not perceptible—as a toper, whose system is tottering to ruin, cannot believe that any *particular* glass of brandy ever did him any harm.

We should never read but in the erect posture ; we should never read when the arterial system is in a state of high action ; we should never read with too much or too little light ; we should never read with a dazzling light of the sun, or fire, striking on our face.

Schoolrooms should be arranged in such a manner, that the light of the sun can be admitted in the right direction—not dazzling the eyes, but striking upon the books ; there should be facilities for admitting the light fully in dark weather, and for excluding it partly when the sun shines brilliantly.

I believe an attention to the physiology and laws of vision, by parents and instructors, would be of great benefit to children, and diminish the number of opticians; for as surely as a stone thrown up will come down, so surely does exposure to causes of evil, bring the evil, at some time, in some way, upon somebody. Truly yours,

HORACE MANN, Esq.

*Secretary of the Board of Education.*

SAMUEL G. HOWE.

### PLANS OF SCHOOLHOUSES.

FIGURE I.

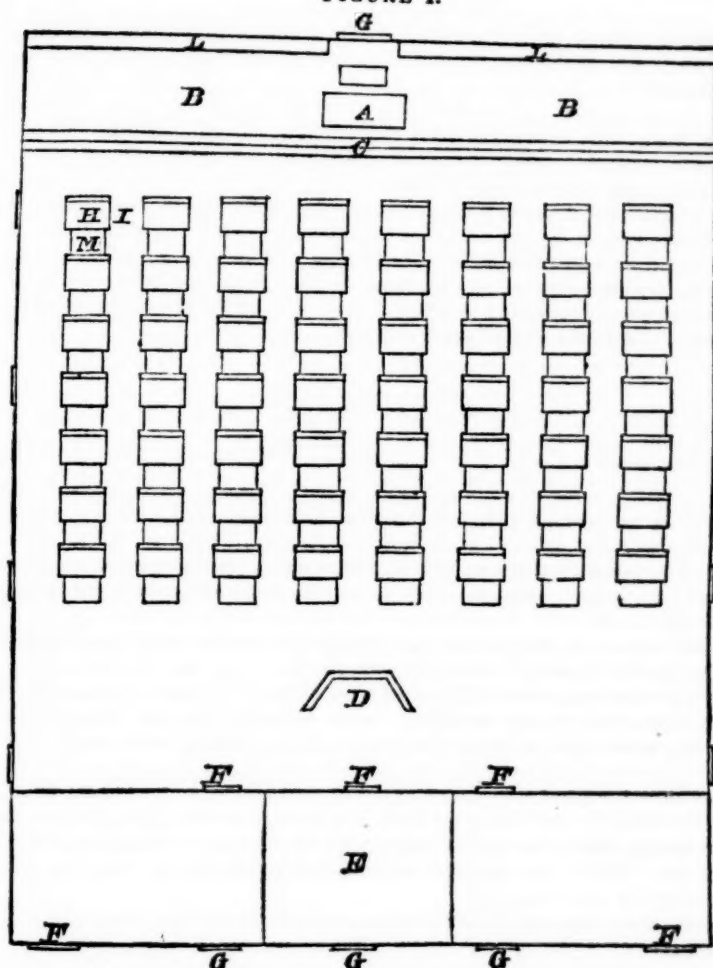


Figure I. represents the general plan of a Schoolhouse, as recommended in the preceding pages.—*A* Teacher's Desk.—*B B* Teacher's Platform, from 1 to 2 feet in height.—*C* Step for ascending the Platform.—*L L* Cases for Books, Apparatus, Cabinet, &c.—*H* Pupils' single Desks, 2 feet by 18 inches.—*M* Pupils' Seats, 1 foot by 20 inches.—*I* Aisles, 1 foot 6 inches in width.—*D* Place for Stove, if one be used.—*E* Room for Recitation, or retiring in case of sudden indisposition, for interviews with parents, when necessary, &c. It may, also, be used for the Library, &c.—*F F F F* Doors into the boys' and girls' entries,—from the entries into the schoolroom, and from the schoolroom into the recitation-room.—*G G G G* Windows. The windows on the sides are not lettered.

The seats for small scholars, without desks, if needed, to be movable, and placed as the general arrangements of the school shall render convenient.

Where there is but one teacher, the space between the desks and the entries to be used for recitation. Here, also, is the place for black-boards, whether movable or attached to the wall. This space should be 8, 10, or 12 feet wide, according to the size of the school.

The height of the room should never be less than 10 or 12 feet.

FIGURE II.



Figure II. represents an end view of the pupils' Desks and Seats.—*J* Pupils' Seats.—*K* Shape of the Board or plank which forms the side and support of the desks. See page 280, &c.

A light green is perhaps the best color for the scholars' desks and seats, as it is more grateful than any other to the eye. For the outside of the house, white is the color most universally pleasing.

[Note to p. 287. It is earnestly hoped that no new schoolhouse will be erected in the country, without a careful inquiry, whether a division and gradation of the schools, as suggested in these pages, be not practicable.

If a union of different districts for this purpose be really impossible, then, if the school be large, or likely soon to become so, there should be a separate apartment for the smaller scholars. This may be effected either by having a basement story under the whole or a part of the principal schoolroom, or by extending the Plan, (as represented in Figure I.,) and having the doors and entries in the centre, with a room on each side, instead of having them, as in the Plan, at the end of the building.]

#### PLAN OF A VILLAGE SCHOOLHOUSE.

[This is the Plan submitted to the American Institute of Instruction, by their Board of Censors, in 1831, and is the same referred to in the Report, p. 236.]

"Figure III. is the ground plan of a village schoolhouse, for both sexes, containing eighty separate seats and desks. Additional seats for small children, who may not require desks, can be introduced at pleasure, and the teacher can arrange them in such situations as may be most convenient. For this purpose a sufficient number of light, movable forms should be furnished.

"The whole edifice, exclusive of the portico in front,—which may be omitted, if a cheap, rather than a tasteful building is required,—is 58 feet long, and 35 feet wide. The dimensions of the *schoolroom* allow 21 feet of floor to each of eighty scholars, the passages, teacher's platform, &c. being included. It is believed that this allowance is not too liberal,—is not more than is required for the comfort, health, and improvement of the scholars.\*

"The plan here proposed may be enlarged or diminished, for a greater or less number of scholars, according to the following scale :—For ten scholars, add 4 feet to the length ; for sixteen scholars, add 4 feet to the width ; for twenty-eight scholars, add 4 feet to both length and width. For a less number of scholars, the length or breadth, or both, may be diminished at the same rate.

"The *schoolroom*, represented in the plan annexed, is 48 feet long, and 35 feet wide, within the walls.

"The floor of the room should be level, and not an inclined plane. Nothing is gained by the common mode of finishing schoolrooms with inclined floors ; and much is lost in symmetry, convenience, and comfort. A faithful and active teacher will be about among his scholars, and not confine himself to a fixed seat, however favorably situated for overlooking them.

"Whether there be a stove in the schoolroom or not, there ought to be an open fire-place, where children may warm and dry their feet. The fire-place should be furnished with a hot air chamber, to facilitate the ventilation of the room.

"The lids or tops of the scholars' desks are usually made to slope too much. They should be nearly, if not quite, horizontal,—an inch to a foot being a sufficient slope.

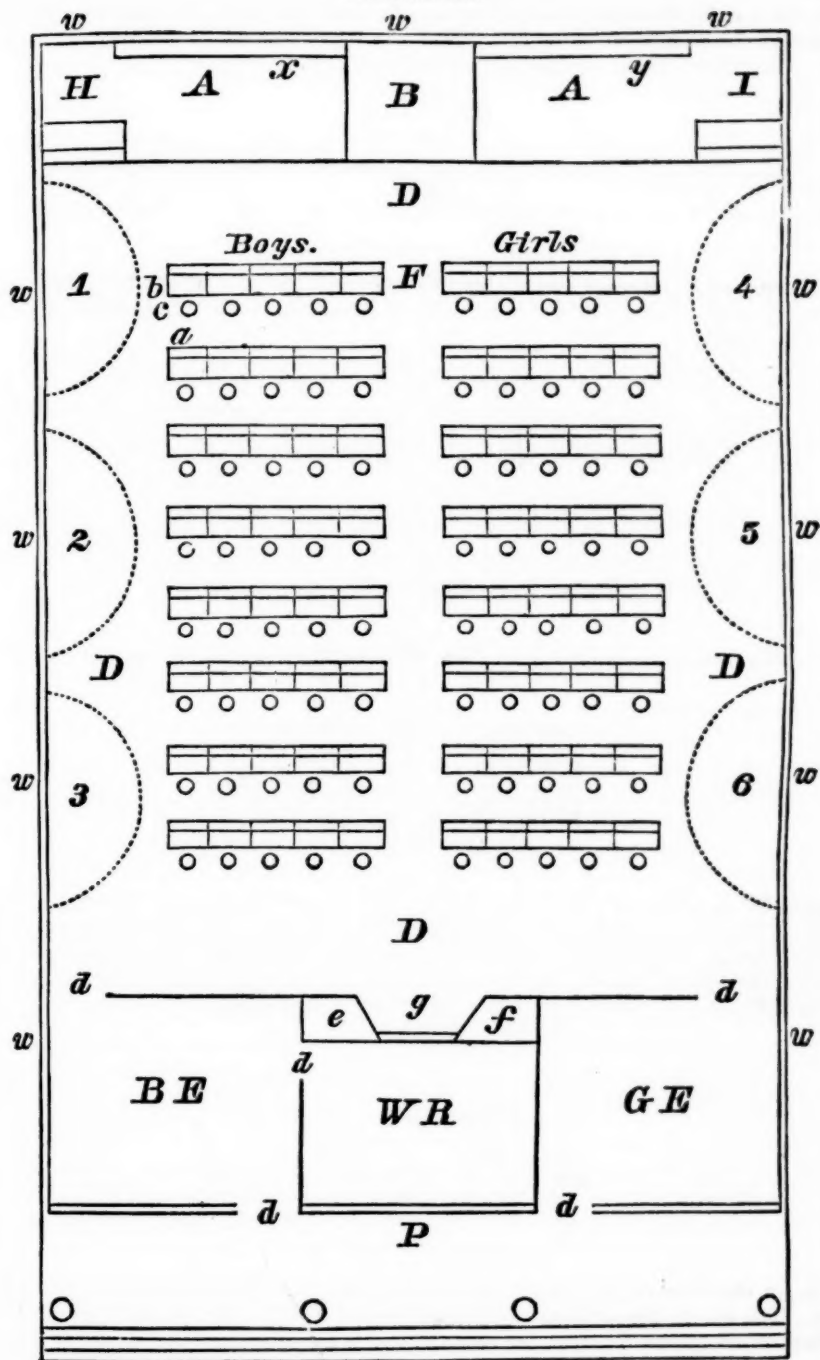
"Each scholar should have a separate seat, which should be confined to the floor. The seat should be about thirteen inches square.

"The front rows of seats and desks, or those nearest the master's platform, being designed for the smaller children, should be lower than those near the entries."

\* "It may not be amiss to state, that two of the Censors teach large private schools in Boston ; and, in their respective schools, they allow, for each of their scholars, about 22 square feet of floor, exclusive of entries, dressing-rooms, recitation-rooms, &c. One of the schoolrooms is 16 and the other 18 feet high—the former giving about 350, and the latter about 400, cubic feet of space, to each scholar."



FIGURE III.



EXPLANATION OF FIGURE III.

*P* Doric Portico in front of the Schoolhouse.—*d d d d* Doors.—*B E* Boys' Entry, 12 by 10 feet.—*G E* Girls' Entry, 12 by 10 feet.—*W R* Wood-Room, 11 by 8 feet.—*g* Fireplace.—*e* Closet.—*f* Sink, to be concealed by a falling door balanced with weights.—*D D D D* Passage around the room, 6 feet wide.—*1 2 3 4 5 6* Stations marked on the floor, to be used by classes, when reciting to monitors.—*A B A* The Teacher's Platform, extending across the room, 6 feet wide and 9 inches high.—*B* A part of the Platform to be removed in the winter, if necessary, to make room for a stove.—*x* Cabinet for apparatus, specimens, &c.—*y* Book-case.—*H* Master's Desk.—*I* Assistant or Monitor's Desk.—*F* Centre Passage; in the plan drawn 3 feet wide, but 4 feet would be better.—*b* Scholars' Desks, 18 inches wide and 2 feet long.—*c* Scholars' Seats.—*a* Passages between

the seats and the next row of desks, 13 inches wide. A desk, seat, and passage occupy 4 feet, viz. : desk 18 inches, space between the desk and seat 2 inches, seat 13 inches, and passage 15 inches.—*w w w*, &c. Windows, which should be placed high from the floor. The scale is about one tenth of an inch to a foot.

FIGURE IV.

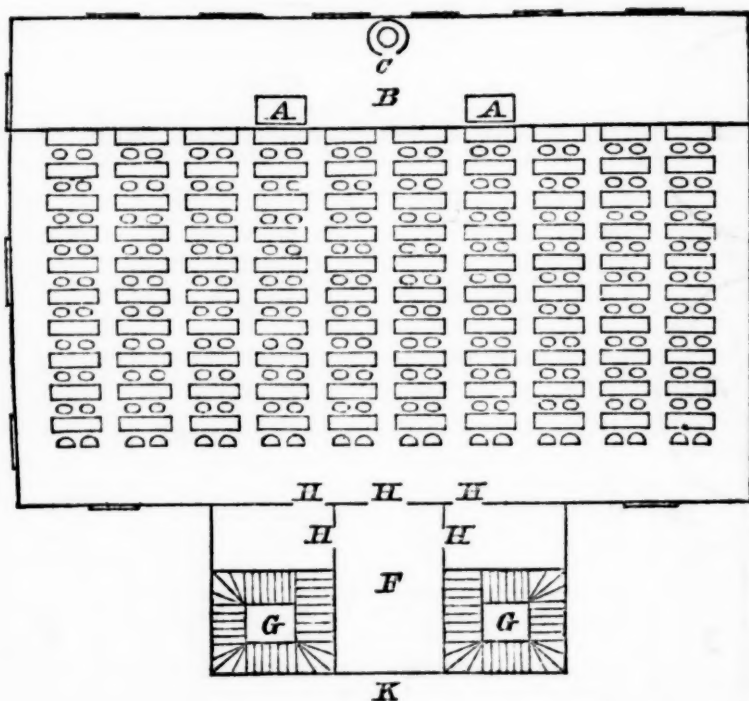
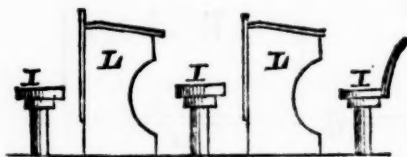


Figure IV. is a Plan of the Second Story of the Wells Schoolhouse, in Blossom Street, Boston. The room is designed to accommodate two hundred pupils. The pupils' desks are double.—*A A* Teachers' Desks.—*B* Platform.—*C* Stove. The external air is introduced through an opening in the wall, and warmed in its passage.—*K* Porch.—*G G* Flights of Stairs.—*F* Small Ante-room.—*H H H H H* Doors.

FIGURE V.



*L L* An end view of the pupils' desks.—*I I I* Seats. The seats in the back row are chairs. The others are without any support to the back. The scholars are tempted to lean backwards against the next tier of seats, which not only throws them into an unnatural and unhealthful posture, but is also a source of annoyance to others.—The seats, also, face the strong light of all the windows on one side of the house. See Appendix C.

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